

REMARKS

Re-examination and favorable reconsideration in light of the above amendments and the following comments are respectfully requested.

Claims 1 - 4, 7 - 12, 14 - 21, 23 - 29, 31, 33 - 35, and 37 - 51 are pending in the application. Currently, all claim stand rejected.

By the present amendment, independent claims 1, 7, 15, 25, 39, and 46 have been amended.

In the office action mailed November 14, 2003, all of the claims in the application were rejected under 35 U.S.C. 112, first paragraph, and under 35 U.S.C. 112, second paragraph. Further, claims 1 - 3 and 37 - 40 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,503,721 to Lupfer; claims 1 - 4 and 51 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,902,472 to Arai; claims 1 - 4, 7 - 12, 14 - 18, 20, 21, 23 - 28, 31, 33 - 35, and 51 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,948,235 to Arai; claims 7 - 12, 14 - 18, 0, 21, 23 - 28, 31, 33 - 35, 37 - 41, 46, 47, 50, and 51 were rejected under 35 U.S.C. 102(b) as being anticipated by Japanese patent publication no. 2000-080460; and claims 1 - 4, 7 - 12, 14 - 21, 23 - 29, 31, 33 - 35, and 37 - 51 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,075,176 to Brinkmann in view of applicant's alleged disclosure of prior art.

The foregoing rejections are traversed by the instant response.

The present invention relates to a coating to be applied to an electrically conductive material. The coating is non-electroplated and consists of 2.0 wt% to about 20 wt% silver and

the balance tin in one embodiment. The coating has a melting point greater than 225 degrees Centigrade and hardness in the range of from 0.32 to 0.41 GPa.

The present invention also relates to a coating consisting of more than 2.0 wt% to 20 wt% silver, at least one addition selected from the group consisting of bismuth, silicon, magnesium, iron, manganese, zinc, and antimony in an amount effective to increasing coating hardness up to 5.0 wt%, and the balance tin. The coating material being non-electroplated and having a hardness in the range of from 0.32 GPa to 0.41 GPa.

The process for forming a coating on a substrate material in accordance with the present invention comprises the steps of providing a substrate material to be coated preparing a bath consisting of 2.0 wt% to 20 wt% silver and the balance tin, immersing the substrate material in the bath to form a coating layer on the substrate material, which coating layer consists of 2.0 wt% to 20 wt% silver, and maintaining the bath at a temperature greater than 500 degrees Fahrenheit during the immersing step. The process further comprises keeping the substrate material resident in the bath for a time period in the range of from 0.2 seconds to 10 seconds.

The Examiner is thanked for the courtesy of conducting a personal interview with the inventor and the undersigned attorney on January 21, 2004. During the interview, the rejections of record were discussed. Also discussed during the interview was the disingenuous position taken by the Examiner regarding hardness being inherent in the tin-silver compositions. As pointed out to the Examiner at the interview, the Examiner has worked in this art for an extended period of time and knows full well that hardness is a function of processing as well as composition. If the Examiner's position

were correct, there would never be any reason to perform a treatment on an alloy composition to increase hardness - in fact, it would be impossible if the Examiner were correct. Since there are hundreds of patents which speak to processes for increasing the hardness of alloy compositions, many issued by the Examiner of record, the position taken by the Examiner is disingenuous and should be withdrawn. The Examiner should have the courage to put into the written record that which he conceded to Applicant and his attorney at the interview and that which he concedes in the most recent office action, albeit in a indirect manner - namely that hardness is a function of composition and processing.

As previously mentioned, all of the claims pending in the application have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. This rejection should be withdrawn because it is improper. The enablement requirement of Section 112, first paragraph, requires that the specification contain a description of the manner and process of making and using the invention in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains to make and use same. To be enabling, the specification must teach those skilled in the art how to make and use the claimed subject matter without undue experimentation. See *In re Wright*, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993); also see *In re Vaeck*, 20 USPQ2d 1438, 1444-45 (Fed. Cir. 1997). The specification in the instant application clearly provides enough detail that a person of ordinary skill in the art could make and use the claimed coatings and the claimed process. This is evidenced by the fact that the Examiner can not point to anything which would not enable one of ordinary skill in the art to make and use the claimed invention. Instead the

Examiner avers that Applicant's original disclosure does not say how Applicant determined the claimed hardness in "GPa" units. It is Applicant's position that Applicant need not explain how the claimed hardness was determined. The instant invention has nothing to do with hardness testing techniques and/or equipment. Thus, the Examiner's basis for the lack of enablement rejection is not well founded. It is not Applicant's burden to explain common and ordinary units of measurement and how are they determined. For example, claiming that something was heated to a temperature in a particular temperature range does not require an inventor to explain how a thermometer or any other temperature measuring device measures temperature. Had the Examiner bothered to look on the Internet, he could have learned that hardness measurements of materials are frequently measured in GPa. See the attached Exhibit A. Also see W.C. Oliver and G. M. Phatt, "An improved technique for determination of hardness and elastic modulus using load and displacement sensing indentation experiments," *Journal of Materials Research*, Vol. 7, No. 6, June 1992.

Similarly the rejection of the pending claims under 35 U.S.C. 112, second paragraph, should be withdrawn. The Examiner's lack of familiarity with all measuring systems and units is not a proper basis for an indefiniteness rejection, particularly when the Examiner could have gained the requisite knowledge from common ordinary sources of such information. A review of the claims shows that there is nothing imprecise or indefinite about the claim language. The claims are quite precise in identifying all constituents, composition ranges, property values, and method steps. The claims give clear notice of what compositions and methods fall within their scope. Because the claims reasonably apprise those skilled in the art

both of the utilization and scope of the invention and because the language is as precise as the subject matter permits, the claims comply with the requirements of 35 U.S.C. 112, second paragraph. See *Shatterproof Glass Corp v. Libby-Owens Ford Co.*, 225 USPQ 634, 641 (Fed. Cir. 1989). Also see *Hybritech Inc. v. Monoclonal Antibodies Inc.*, 231 USPQ 81, 94 - 95 (Fed. Cir. 1986, cert. denied, 480 U.S. 947 (1987).

Claims 1 - 3 and 37 - 40 are not anticipated by the Lupfer patent of record. In order to anticipate a claimed invention, the reference must disclose each and every feature set out in the claims. Lupfer does not teach or suggest how one could form a coating having the claimed composition and hardness. As discussed above, and as is well known to the Examiner, **HARDNESS IS A FUNCTION OF PROCESSING AS WELL AS COMPOSITION**. While Lupfer may talk about dip soldering in baths having tin silver compositions, Lupfer does not disclose how long one should keep the material being soldered immersed in the bath. Thus, Lupfer does not, and could not, teach or suggest how to obtain a coating having the claimed hardness.

Further, it is well settled law that an anticipatory reference must be enabling in order to place the allegedly disclosed matter in the possession of the public. See *Akzo N.V. v. U.S. International Trade Commission*, 1 USPQ2d 1241, 1245 (Fed. Cir. 1986), cert. denied, 428 U.S. 909 (1987). The Lupfer patent is non-enabling, and thus, not available as an anticipatory reference for the reasons stated above.

As for claims 37 - 40, these claims are allowable because Lupfer fails to teach or suggest forming a coating having the claimed composition and hardness and the claimed temperature maintaining step set forth in independent claim 39. With respect to the Examiner's comments about Lupfer's expected temperatures,

the issue is not what the melting temperatures of a particular composition can be expected to be, but rather what temperature is used and taught by Lupfer. In this regard, Lupfer only teaches using a temperature below 221 degrees Centigrade. See column 3, lines 24 - 26 and column 2, line 34. Since the 3.5% silver melts at 221 degrees Centigrade, there is absolutely no reason to believe that whatever it is that Lupfer is doing would result in a 2% silver composition having a higher melting point. The Examiner's comments are merely an unfounded assumption about Lupfer. There is absolutely no support for the Examiner's comments in Lupfer. If the Examiner believes such support exists, then he is hereby requested to point out the relevant portions of Lupfer.

With respect to the rejection of claims 1 - 4 and 51 over Arai '472, this reference does not anticipate the claimed invention. As much as the Examiner may want to ignore it, Arai 472's coating is an electroplated coating and the claims clearly call for a non-electroplated coating. As pointed out during the interview on January 21, 2004, and paragraph 5 of the Strobel declaration filed in the parent application, an electroplated coating is very much different physically from a non-electroplated coating. In this regard, it should be noted that electroplated coatings are characterized by undercuts, which make them very brittle - a problem not encountered with the coatings of the present invention. Additionally, there is no disclosure in Arai '472 of how to form a coating having the claimed hardness. While the Examiner has taken the position that hardness is inherent in the composition, there is no evidence to support such a position. In fact, evidence previously produced by Applicant with respect to the Lupfer composition and the Brinkmann coating clearly shows that such a position is

erroneous. Applicant submits that since this position flies in the face of conventional thinking that the Examiner has the burden of presenting technical reasoning sufficient to support his controversial theory.

The examiner's citation of the *Brown* and *Fessmann* cases are duly noted; however, these cases are inapplicable. Both of the cases have to do with the Examiner's burden of proof in making out a case of obviousness for product-by-process claims. First, it must be noted that Applicant's claims are not product-by-process claims. The word "non-electroplated" refers to a physical characteristic of the coating. Second, the Examiner is not making out a case of obviousness, rather he is attempting to make out a case of anticipation. In order to establish Arai as an anticipatory reference, it is the Examiner who has the burden of presenting technical reasoning as to why the disclosure in Arai '472 produces the claimed coating composition. All the Examiner has produced to date is unfounded conclusions, unsupported by the Arai disclosure. Having submitted the Strobel declaration, it is up to the Examiner to disprove the statements of the Strobel declaration. Regarding claim 51, there is nothing in Arai which states that the substrates are continuous, thus the reference can not possibly anticipate the claim limitation.

The Examiner's comments in paragraph 29 about Arai's coatings being subjected to melting after being plated on the substrates is duly noted. These comments do not appear to have any basis in either of the Arai references. If they do, Applicant would appreciate it if the Examiner would point out the portion of portions of Arai which support these statements. If such portions do not exist, then the comments by the Examiner are unsupported by any evidence and are pure surmise on his part. As a result, Applicant hereby asks the Examiner to provide

him with definitive evidence which would establish that the electroplated coatings of Arai are ever converted into another microstructure. While the Examiner will not admit it, Arai's coatings are always electroplated coatings.

With regard to the rejection of claims 1 - 4, 7 - 12, 14 - 18, 20, 21, 23 - 28, 31, 33 - 35, and 51 over Arai '234, these claims are allowable for the same reasons that the claims are allowable over Arai '472. Arai '235 is directed to the formation of an electroplated coating, not a non-electroplated coating. As mentioned above, electroplated coatings are physically distinguishable and quite different from non-electroplated coatings. Further, Arai '235 does not disclose that the coatings formed using his electroplating solution have the claimed hardness. Additionally, the Examiner has not provided any rational technical reason how the Arai '472 patent enables the product of a coating having the claimed hardness.

The rejection over the Harada patent has been mooted by the amendments to independent claims 7, 15, 25, and 46. Claims 7, 25, and 46 have been amended to delete any reference to "copper" and claim 15 has been amended to say that copper is present in a range of from 2.5 to 5.0 wt%, which is outside the copper range disclosed in Harada. With regard to independent claim 39, no amendment is required because the bath being claimed consists only of tin and silver. Harada does not teach or suggest using such a bath.

The obviousness rejection of claims 1 - 4, 7 - 12, 14 - 21, 23 - 29, 31, 33 - 35, and 37 - 51 over Brinkmann and the alleged prior art disclosure fails for the reasons of record, which reasons are incorporated herein. Brinkmann simply does not enable one of ordinary skill in the art to form the claimed coating compositions of the present invention having the claimed

hardnesses. As previously stated, hardness is not inherent in the composition. It is a function of composition and processing. This was demonstrated in the previously submitted declaration of Richard Strobel. In fact, this position was also conceded by the Examiner when he questioned the data in the Strobel declaration as failing to compare the hardnesses of coatings produced by the process of the references and coatings produced by the processes of Applicant's disclosure. If hardness was inherent in the composition, as the Examiner contends, then the processing should not matter. Thus, there would be no need to discuss the processes. The fact that the Examiner even asks the question in the most recent office action evidences that the Examiner knows that processing plays a role in creating a coating with a desired hardness.

Further, with regard to the Brinkmann patent, it should be noted that Brinkmann is non-enabling. For example, Brinkmann does not set out a residence time for the material in the tin alloy bath. It also does not say how the copper alloy metal band was coated with the tin alloy. Thus, it is impossible for one to replicate the Brinkmann examples. When this was pointed out to the Examiner during the January 21, 2004 interview, the Examiner said "make reasonable assumptions". The fact that Applicant would have to make any assumptions at all only goes to show that Brinkmann is non-enabling and thus, not available as an anticipatory reference. A prior art reference that gives only general guidance and is not at all specific as to particular form of the claimed invention and how to achieve it may make a certain approach "obvious to try" but does not make the invention obvious. See *Ex Parte Obukowicz*, 27 USPQ2d 1063, 1065 (B.P.A.I. 1992). Also see *In re Farrell*, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). It is submitted that Brinkmann, for the

reasons stated above, is not specific to the claimed invention and how to achieve it.

To show once again that Brinkmann does not teach one of ordinary skill in the art to make the claimed coatings with the claimed hardness, a test was conducted "making reasonable assumptions". The test is reported in the supplemental declaration of Richard Strobel attached hereto as Exhibit B. As reported in the supplemental declaration, the hardness of a tin-1 wt% silver-0.03 wt% phosphorous coating on a copper alloy substrate ranged from 0.280 - 0.293 GPa, which is outside the claimed range.

Further, it should be noted that there is nothing in Brinkmann which teaches or suggests: the binary coatings of claims 1 - 3 and 51; the coating of claims 7 - 9, 25 - 27 having the claimed range of silver; the coating of claims 15 - 17 having the claimed silver and copper constituents; the process steps of claims 37 - 45; the process steps of claims 46 - 50. Most notably missing from Brinkmann is the residence times set out in claims 44 and 46 and the lubricant applying step of claim 45. If the Examiner believes that the lubricant applying step is conventional in the field, then he should have no difficulty citing a reference to same. As to the residence times set out in claims 44 and 46, not everything missing from the claim is merely a matter of optimization. The case law on obviousness still requires that there be some teaching or suggestion of using the claimed residence times. Clearly, Brinkmann does not provide such a teaching or suggestion because it is totally silent on the point. As discussed above, residence time is important to the issue of hardness. The alleged admitted prior art does not cure any of these defects in Brinkmann.

With regard to the Examiner's reliance on the Aller case, the reliance is misplaced for a variety of reasons. The Aller case relates to the patentability of a process, not an article. Second, Aller notes that processing changes may impart patentability if the particular ranges claimed produce a new and unexpected result. In the instant case, Applicant's process yields a coating which has a composition and a hardness that is not to be found in the Brinkmann patent. Applicant submits that as to Brinkmann, this is new and unexpected. It must be remembered Brinkmann's tin-silver compositions always include a deoxidizing agent (phosphorous), which is not present in Applicant's compositions. It is time for the Examiner to stop talking in generalities and start pointing out specifically where the claimed subject matter can be found in Brinkmann. If the examiner can not find the claimed subject matter in Brinkmann or elsewhere, then it is time to allow the application.

With respect to the Examiner's comment that phosphorous is only present in the Brinkmann composition in a minor amount, the Examiner knows from his own experience that such a statement is misleading and inaccurate. Phosphorous in an amount of 0.03 wt% is a significant deoxidizing agent in a tin-silver alloy. This is not in any sense the impurity level which the Examiner avers.

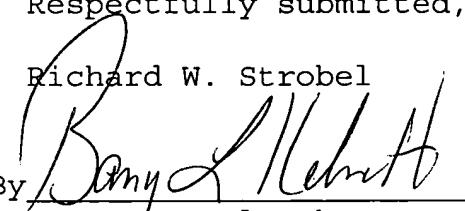
For the foregoing reasons, the instant application is believed to be in condition for allowance. Such allowance is respectfully solicited.

Should the Examiner believe an additional amendment is needed to place the case in condition for allowance, he is hereby invited to contact Applicant's attorney at the telephone number below.

A one month extension of time and a check in the amount of \$55.00 to cover the extension of time fee is enclosed herewith. Should the Commissioner determine that an additional fee is due, he is hereby authorized to charge said fee to Deposit Account No. 02-0184.

Respectfully submitted,

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I, Nicole Motzer, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on March 11, 2004.

